

The Nature and Extent of Indian Agriculture in North America

by Faye Dodge

May, 1911

Submitted to the Department of Sociology of the
University of Kansas in partial fulfillment of the
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The Nature and Extent of Indian Agriculture in North America

A great many people, even at the present time, think of the Indian race which inhabited the North American Continent at the discovery of America as a wild and savage horde which wandered about over the country and subsisted entirely upon the plants and animals which Nature was kind enough to provide for them. People think that they lived together and roamed restlessly with no principles of life or ideals of family sincerity and group justice. This idea has grown very naturally from the stories told by the early pioneers who did endure very many hardships. But it is also true "that ⁽¹⁾exaggeration of one kind or another has always been the inheritance of the Indians and it has only been within a comparatively few years that these Americans of yesterday, as Frederick S. Dellenbaugh calls them, have been scientifically studied and their real character and attainments given proper places."

"In the United States, we have usually regarded the Indian as the incarnation of evil, a treacherous demon with a bloody knife,---and so callous have we become to his good points that James F. Cooper is ridiculed for his delineation." But we can be interested in the people who inhabited this country before we came without being scorned "an Indian

Lover." We are eager to make elaborate studies of the European primitive peoples because we believe that they were our own ancestors. And surely humanity everywhere passes thru the same stages of developement. Professor Morgan classifies mankind in three broad ethnic groups or stages, Savagery, Barbarism and Civilization. The first period ends with the acquisition of the bow and arrow and the second with the smelting of iron and the third begins with a phonetic alphabet. Another classification of progress from the economic standpoint has been given as the direct appropriation period, the pastoral, the agricultural, the handicraft and the industrial periods. Our interest then is--to what period did the Indians belong at the discovery of America?

Of course a study of the progress of the Amerinds as J. W. Powell calls them, could be an investigation of their languages, their customs, their physical characteristics, their arts and industries or their religion and mythology. But since food quest and climate are the forces that ever impel early peoples on, we prefer to observe their cultivation of the soil and their tendencies to live a sedentary life. some one has said that within a century, the history⁽²⁾ of the human race has been practically the history of agriculture, the term being here used in its broadest sense, "as the science and art of the production of all plants and animals useful to man." If this is true even in a measure,

we feel justified in endeavoring to find out the nature and extent of the early Indian agriculture.

Professor Powell in the Geological Survey ⁽³⁾ says,--"The first part in a historical and social study of a tribe or nation must be a thorough examination of the country and of the climate (in the widest sense of this term) in which it has grown up, for these two agencies give character to peoples, races, languages, institutions and laws. This principle applies equally to the cultured and to the under or less developed populations of the globe, for none of them can possibly hold itself aloof from the agencies of nature, whether acting in a sudden manner or gradually, like the influences of climate." Thus it is essential that we notice the physical environment of North America in connection with the food supply and the habits of life among the Indians.

North America ⁽⁴⁾ is a large triangle with its base in the north and its apex in the south. The mountain ranges in the East and West are the most striking relief features. The Cordillera in the west extends the entire length of the continent and is in reality a great plateau which reaches a breadth of almost 1000 miles in the United States and has an elevation of from 5 to 10,000 feet. In the east the Appalachian system which is not a continuous range but exhibits breaks and groups, lies. The wide expanse between the mountains is the "great plains" area which is drained by

the Mississippi and its tributaries, the Ohio, Missouri, Arkansas and Red Rivers etc. In Canada is that region called the "Grainless North." Also in the northeast, the chain of Great Lakes are remarkable while in the southeast, the Coastal Plain area is significant. Another factor which is of importance in connection with race distinction is the record of a glacial sheet which spread over a large part of Canada and the United States in recent geological times. The drift deposit which was left at its retreat has produced most fertile soil.

There are many varieties of timber and agriculture
(5)
products in America which are due largely to the diversity of climate. The great forest belt is in the north, still the west has its share of conifers which reach a "luxuriance unequalled elsewhere" in the world and the east is favored with conifers also and some hard woods. The Indians did not use the forest products to a large extent, though the maple afforded them with excellent sugar and many roots and nuts furnished wholesome nourishment. From an economic standpoint the cereals were of supreme importance. Corn was probably a native of Central America and was generally in use among the Indians upon the arrival of the whites. Tobacco was indigenous to America and we suppose that the Indians have used it from time immemorial. Beans, squashes, and pumpkins and many other vegetable food stuffs were

raised on the prairies.

The animal life of America ⁽⁶⁾ is also widely diversified. In the south east the white tail deer is serviceable to man and was the staple source of food and clothing to the Indians. It is the most adaptable and the most abundant of American deer. A near relative of it is the mule-deer which inhabits the "Bad Lands" and the foot hills of the Rocky Mountains. Mountain sheep or Big Horn and Rocky Mountain goats were of primary significance to the Redskins. But the most note-worthy of all American animals in connection with a study of this race is the bison or buffalo on account of "its majestic size, its former large numbers and its practical value." The Indian utilized the flesh for food; the hide for tipi, clothing and bedding; the sinews for thread, rope and bow string; and the bones and horns for implements of different kinds. Of course in the arctic regions were found the polar bear, arctic fox, arctic hare, musk ox and other animals, some of which were used. There were also numerous kinds of birds and fish which furnished food and ornament.

In order that we may follow the search for evidences of agriculture more easily let us adopt some classification of the Indian tribes. Anthropologists ⁽⁷⁾ of today determine groups on four sets of characteristics, physical, linguistic, geographical and general culture. For scientific study the

linguistic has been the most satisfactory. And it shows several points of interest in regard to the distribution of the families. Most of them occupy continuous areas which argues strongly for the opinion that the Indians were mainly stationary at the time of the arrival of the Europeans. The Bureau of Ethnology in Washington has determined that there are fifty-nine independent families north of Mexico and it is the best classification at our disposal. Most of these tribes and stocks have been described in literature under different names and as a consequence, the common designation is often very different from the technical. So the following is an attempt to locate the principal families. The Algonkian stock occupied most of that region north and east of the Great Lakes and Hudson's Bay. The Athabaskans held the interior portions of Alaska and Canada while the Esquimaux claimed the extreme northern parts of the continent. The Iroquois peoples were those about Lakes Erie and Ontario and on both banks of the St. Lawrence and in the present states of New York, Pennsylvania and Ohio. A division of their stock is found in Virginia which indicates migration at some earlier time. Also a similar case with the Athabaskans in New Mexico and Arizona and the Sioux in the east. The Caddoan stock lived in the country between the Arkansas and Colorado Rivers in Louisiana and Texas. The Shoshonian family roamed the western part of the United States from

California to the basin of the Missouri and the upper Mississippi where the Siouan people hunted and fished. The Yumas and Pimas occupied that territory in the southwest, just on the border line between the United States and Mexico. It would be impossible to distinguish the smaller groups as there are five sixths of all the linguistic families of America found along the Pacific Coast.

With so much as a basis for consideration, we shall proceed to enumerate the evidences of soil culture which we have been able to secure from those authorities which we hold valuable and have access to.

Evidences of Sedentary Life,

In Volume 21 of the Jesuit Relations we find this statement ⁽⁸⁾ which was written in 1641----"After Montreal, Videe turbam magnam quam dinumerare nemo potest ex omnibus gentibus; I see at the south and at the west a great number of tribes that cultivate the land and that are entirely sedentary but have never heard of Jesus Christ, the door to all of these has been shut against us by the Iroquois." In another relation, Le Jeune, a French missionary writes of the Hurons or the Nation of the Bear. ⁽⁹⁾ "I do not claim here to put our savages on a level with the Chinese, Japanese and other nations which are perfectly civilized, but only to put them above the condition of beasts, to which the opinion of some has reduced them, to give them rank among men and to show that even among them there is some sort of political and civil life. It is in my opinion, a great deal to say that they live assembled in Villages with sometimes as many as fifty, sixty and one hundred cabins,---that is three hundred and four hundred households; that they cultivate the fields, from which they obtain sufficient food for their support during the year; and that they maintain peace and friendship with one another. Leaving out some evil-minded persons, such as one meets almost every where, they have a gentleness and affability almost incredible for Savages,

They are not easily annoyed and moreover, if they have received wrong from anyone they often conceal the resentment they feel, at least, one finds here very few who make a public display of anger and vengeance. They maintain themselves in this perfect harmony by frequent visits, by help they give one another in sickness, by feasts and by alliances. When they are not busy with their fields, hunting, fishing or trading, they are less in their own Houses than in those of their friends; if they fall sick or desire anything for their health, there is a rivalry as to who will show himself most obliging. If they have something better than usual as I have already said, they make a feast for their friends and hardly ever eat alone. In their marriages there is this remarkable custom---they never marry any one related in any degree whatever, either direct or collateral; but always make new alliances, which is not a little helpful in maintaining friendship. Moreover by this so common habit of frequent visitation, as they are for the most part fairly intelligent, they arouse and influence one another wonderfully, so that there are almost none of them incapable of conversing or reasoning very well and in good terms, on matters within their knowledge. The councils, too, held almost every day in the Villages and on almost all matters improve their capacity for talking; and, although it is the

old men who have contro there, and upon whose judgement depend the decisions made, yet, every one who wishes may be present and has the right to express his opinion."

Such a picture of life in America during the seventeenth century comes as a surprise to us and we know that such a group of people must have been dependent on agricultural pursuits. Father L'Allemant⁽¹⁰⁾ in a letter to his brother says "Tribes are found along the Saint Lawrence River who are more sedentary than those spoken of before; they build large villages which they fortify against their enemies and cultivate the land in earnest. It thus happens that they have stores of Indian corn and do not die of starvation. As to the customs of those Savages, it is enough to say that they are altogether savage. From morning until night they have no other thought than to fill their stomachs." In another letter Le Jeune⁽¹¹⁾ believes that it would be easy to convert the sedentary tribes but difficult to win the wandering tribes. Though he is glad that some have become weary of their miserable way of living and are now beginning to cultivate the soil and sow Indian Corn in 1632. F. Du Peron in a letter concerning his trip to Canada among the Hurons and Quebecs, writes, "The Huron country is tolerably level and with many prairies, many lakes, many villages. Their land produces nothing but Indian corn, beans and squashes. One sees birds, fish and forest animals. The land as they

do not fertilize it, produces for only ten or twelve years at most and when ten years have expired they are obliged to remove their village to another place. If tilled the lands yield well. So much for the cultivation of the land which is the occupation and employment of the Huron women, that of the men is fishing and hunting." In the Expeditions of Zebulon Montgomery Pike,⁽¹²⁾ we find accounts like these-- "The Iowas reside on De Moyen and Iowa Rivers in two villages." "In coming into the country⁽¹³⁾ of the Osages he mentions continually Big Village, Little Village, Grand Village" etc. On the Lewis and Clarke Expedition⁽¹⁴⁾ we find descriptions of the journey which indicate the life of the Indians to us. "Directly opposite us were five houses of Indians who were drying fish on the same small island where we had passed nine lodges." On the way down the Columbia River in 1805, a village⁽¹⁵⁾ was observed which was the residence of a tribe called the Echeloots, and consisted of twenty one houses. The organization and government of the people of the Northwest as given in the United States Geographical and Geological Survey⁽¹⁶⁾ of the Rocky Mountain Region would indicate that very many of the tribes were completely sedentary. And "the first notices of the Indians of Oregon and Washington Territories that we have are by Vancouver, whose voyage was performed in 1792, twelve years before the Lewis and Clarke expedition but they are the most reliable. The

people were living in villages which had the appearance of being very extensive and populous. The manner of the Indians was very civil, orderly and friendly."

The Southwest⁽¹⁷⁾ needs only to be mentioned and we recall the wonderful ruins of the Pueblos and other tribes. The ruins in the Mississippi valley also show the traces of the Indian settlements. While the Southeast is known to have had fixed habitations of logs when visited by De Soto, Bancroft says that the Pueblos⁽¹⁸⁾ of New Mexico and the Moquis of Arizona had a civilization of over 300 years before Coronado's visit in 1540. As to the civilization of the southern part of North America there is a controversy. Just what culture had the people of Mexico and Central America attained when the Spaniards found them? Dr. Brinton⁽¹⁹⁾ says of them, "Throughout the continent there is not a single authentic instance of a pastoral tribe, not one of an animal raised for its milk nor for the transportation of persons, and very few for their flesh. It was essentially a hunting race." He adds "The one mollifying element was agriculture, substituting a sedentary for a wandering life, supplying a fixed dependence for an uncertain contingency." There were also found many evidences of beautiful terrace cultivation.

Dr. H. F. Helmolt in the History of the World writes the following: "But what a race, what a state must have been, which not only produced these structures but protected

the banks of the chief rivers for many miles with extensive fortifications⁽²⁰⁾ such as would seem in early tribes to have accompanied the Mississippi in an almost uninterrupted chain from the mouth of the Arkansas up to Illinois. A sedentary population of such density must naturally have been mainly dependent on a cultivated food supply and that the mound builders had been agriculturists was evident from all that was brought to light in the excavations made in the mound region. Not only were grains of maize found, with the vessels and implements necessary for its preparation but the excavations or inferences from them, proved that other seeds and fruits were also possessed by mound builders. Indeed their agriculture must have been already highly developed for careful investigation revealed not only irrigation works and aqueducts of considerable extent in places but in valleys of the great rivers were cultivated patches, on which the excess of moisture had been counteracted by a raising of the ground in beds." Just at this point may we take the opportunity of stating the attitude which we think is sanest in regard to the peoples of the North American Continent. The Mound Builders and Cliff Dwellers do not represent any mysterious races who were dropped down by Providence, perchance, to dwell for a few years and die. Nor does their disappearance represent retrogression of American peoples necessarily. It is very logical that in the evolution of human races that part of the population which was

most advanced and desired peace and home had to take the defensive against the less civilized nations. Thus may the condition of America at the discovery be explained as many degrees of civilization were found.

Of the Algonkian race,⁽²¹⁾ Dr. Helmolt believes that there is no doubt but that they had adopted a settled mode of life and had begun to engage in agriculture. The Muskogees⁽²²⁾ of the southeast were also by no means at a low level of existence. "They tilled the ground on a most extensive scale and their agricultural produce excited the admiration of De Soto's Spaniards. Their settlements⁽²³⁾ were called towns and some of them contained a large number of inhabitants." In a similar way the people of the northwest especially in Oregon and Washington congregated in small fishing villages. We find that the Eskimo⁽²⁴⁾ and northern tribes had also learned to cooperate in providing for their every day sustenance.

In recapitulating the evidences⁽²⁵⁾ of sedentary life which we found, we conclude that certain tribes from the extreme north to the extreme south were at least in the transition period from a hunting to an agricultural state. Some had already become entirely agricultural and their dependence on meat diet was only secondary. Others⁽²⁶⁾ had begun life in villages but still retained hunting as their chief vocation. In such tribes we notice woman developing the agricultural pursuits and the home life becoming more stabile.

2
X

Extent and Culture of Indian Corn.

Since we have learned something of the state of Indian Life we are now ready to investigate the extent of their culture of plant and animal life. We will begin with maize or Indian corn since it furnished the largest portion of their diet. We will pass any botanical exposition and hunt for the things which seemed of vital importance to the Indians. The success of the cultivation of Indian Corn⁽²⁷⁾ depends on four things, the fertility of the soil, the conditions of climate, and the quality of seed and the methods of cultivation. As indicated in a reference above⁽²⁸⁾, the Indians recognized both the necessity of change of seed and of ground. As to methods we shall find they were crude but effective and so the Indian saw very little reason to invent anything new for himself but was eager to adopt the suggestions of the white man⁽²⁸⁾ after he was converted by the increase of crops. Yet the white man must admit that he learned to hill up corn from the Indian and only taught the Indian to use his improved implements.

The Indians prepared the ground for sowing or rather the Indian women did in this manner. The implements⁽²⁹⁾ were of wood, bone, stone or shell. "Unworked shells, lashed to rude handles, served all the purposes as well as if wrought out in the most fanciful manner. The large, firm valves of clam-shells were most frequently used." The women with

these pickers or hoes⁽³⁰⁾ raise up only the upper part of the soil, break it up if there are weeds, grass or old stubs or cornstalks in it. And it was a usual custom to burn over the ground to free it of rubbish. "Sagard⁽³¹⁾ an eye witness of what he reports, says in speaking of the agriculture of the Hurons in 1623-26 that they dug a round hole at every two feet or less where they planted in the month of May in each hole, nine or ten grains of corn which they had previously selected, culled and soaked for several days in water. And every year they thus planted corn in the same spots and places which they renovated with their small wooden shovels." In Virginia,⁽³²⁾ The Indian tribe had its garden which it cultivated very carefully. The ground was always kept free from weeds of any kind and the corn hills well rounded up. They had several varieties of corn and were able to choose only the perfect grain for seed corn.

The Jesuit Relations offer us the proofs of its cultivation in the northeast--Bressani⁽³³⁾ describes the Huron country, "The Hurons and other Peoples distant from the sea, who are sedentary, hunt only for pleasure or on extraordinary occasions; yet they have neither bread, nor wine, nor salt, nor meat, nor vegetables, nor any other food usual in Europe. They content themselves with corn cooked in pure water or seasoned when possible with some fish or meat, fresh or smoked, without any use of salt or other condiment; and

with this grain are sown the fields which they cultivate."

The Expeditions of Zebulon Montgomery Pike offer some evidences⁽³⁴⁾ of agriculture in the central portion of the United States. The travellers mention sometimes in a very commonplace manner, facts which are important to students, for instance, we are told that the Sandy-lake Indians had horses and raised plenty of Irish potatoes and caught many kinds of fish and used certain birds for diet which seems to indicate that these Indians had borrowed customs from the whites very quickly. "The first nation of Indians whom we met with in ascending the Mississippi from St. Louis were the Saks who principally reside in four villages. These people under the auspices of the Sioux make war on the Santeaux, Osages and Missouris. It appears that it would by no means be a difficult matter to induce them to make a general peace and pay still greater attention to the cultivation of the earth; as they now raise a considerable quantity of corn."

In reviewing all the travels of the Northwest we find no records of corn or maize having been raised. The Sioux Indians were still in the hunting period and the coast tribes used fish as the staple food. But numerous references are made to it in other parts of the country. "As early as 1534 Jacques Cartier⁽³⁵⁾ observed large fields of growing corn where Montreal now stands and Champlain in 1604

found it in cultivation in almost every point visited in Nova Scotia." The supplies of corn obtained from the Indians by the New England and Virginia colonies are well known whennepin, Marquette, Joliet, La Salle and other French explorers found all the tribes from north to south cultivating corn. The same was true of the tribes between northwestern Mexico and the plains of Kansas when visited by Coronado⁽³⁶⁾ in 1540. In upper Missouri there were many corn patches when first seen by the whites. When De Soto visited the Indians of the Gulf states, they relied chiefly on corn. The Iriquois and Huron tribes of Virginia and Carolina also relied on corn. Du Pratz says that all the Indians from the sea back as far as Illinois made corn the chief food. The amount of corn which Denonville destroyed in 1687 has been estimated at 1,000,000 bushels but this is perhaps far too large. According to Fonti, who took part in the expedition, the army spent seven days in cutting the corn of four Iroquois villages. General Wayne writing of the Indian settlements in 1794 asserts that on the banks of the rivers there were large fields of corn.

Of Fernando de Soto's Expedition⁽³⁷⁾ we learn from a narrative (of the expedition) which was published in 1557 that several points in Florida were the poorest samples of maize country which they found. Upon travelling north in Florida through, they came upon one hundred or more acres of excel-

lent land which was being rudely tilled. Each family⁽³⁸⁾ had by right of use or agreement a field of several acres, "The only implement they have is the single bladed hoe, common on the southern plantation. However, nothing more than that was required." The chief product of that whole area was corn. Sir William Berkeley, governor of Virginia was sent out on an expedition⁽³⁹⁾ once and on returning reported that he had found extensive and fertile valleys and he offered this upon his judgement concerning the Indian agriculture. A letter from Mendoza to the Spanish King dated April 17, 1540 states⁽⁴⁰⁾ these facts about Florida. The country is good for corn and beans but they do not have any fruit trees. No cotton is raised there but corn flourishes well.

Father Allones tells what he saw when he arrived in the village of the Illinois⁽⁴¹⁾ in 1675. "They live on Indian corn and other products of the earth which they cultivate, like the other savages on the prairies. They eat fourteen kinds of roots which they find in the prairies. They gather from the trees and plants forty two different kinds of fruits, all of which are excellent, and catch twenty five sorts of fish. They hunt the bison, turkey and twenty two kinds of animals and some forty kinds of game and birds altogether. Jolliet and Marquette⁽⁴²⁾ on the discovery of the Southern Mississippi write, "The soil is so fertile that it yields corn three times a year. It produces, naturally,

frutjs which are unknown to us and are excellent. Grapes, plums, apples, mulberries, chestnuts, pomegranates and many others are gathered everywhere and almost at all times, for winter is only known there by the rains. The country is equally divided into prairies and forests and provides fine pastures for the great number of cattle with which it abounds. The wild cattle never flee. The Father counted as many as four hundred of them in a single herd. Stags, does and deer are almost everywhere. Turkeys strut about on all sides, parroquets fly in flocks of ten or twelve and quail rise on the prairies at every moment."

Henry S. School craft in his "Bureau of Indian Affairs"⁽⁴³⁾ states his opinion in regard to the antiquity of Indian society. By their adherence to the patriarchal form of the family with the source of power and authority in the father he draws his conclusion. In substantiating his decision he reviews the evidences of agriculture even in the so called "hunter state." He says that the Indians in Michigan, Wisconsin, Iowa, Minnesota and Missouri cultivated wild rice to a large extent. Thier cultivation of maize or Indian corn was more difficult. After they had planted and cared for it until it was mature, then all sorts of devices had to be conceived of to keep the birds from destroying it, so numerous had they become. Z. M. Pike also refers to the large numbers of birds⁽⁴⁴⁾ in the early days of exploration,

The Agricultural Report for 1899 says that corn⁽⁴⁵⁾ was raised all over the eastern side of North America; that it was indigenous and the Indians raised it from time immemorial. They scraped the ground with sharp sticks or clam shell and planted it. At harvest they gathered it and stored⁽⁴⁶⁾ it away in bags hidden in the earth or hung it out to dry thoroughly. The Early Western Travels which tell of the experiences of many travellers⁽⁴⁷⁾ offer us a great deal of evidence. Mr. Beatty reports on a trip taken in 1740, that corn, beans and fruits were found among the northern tribes. On a trip taken in 1819 the Kansas⁽⁴⁸⁾ and Oklahoma cornfields were mentioned.

Thus far we have found but scattered remarks concerning the culture of corn in the various portions of the United States but the record of its cultivation in Mexico, New Mexico and Arizona is not so fragmentary. "The New Mexican food⁽⁴⁹⁾ is all similar; most of them make more or less pretensions to agriculture and are habituated to a vegetable diet." The Navajoes, Mojaves and Yumas have probably been acquainted with agriculture for a long period. They grow corn, beans, pumpkins, melons and other vegetables. They attempted a system of irrigation but little is known except as the ruins offer explanation. The semi-civilized town and agricultural peoples of that region raised corn, beans, fruits also used fish and bred poultry. Some irrigation was of this sort: Rain water was kept in large tanks and

distributed over the fields by ditches. Lieutenant Ives visited the Moquis of Arizona in 1858 and his description is the best extant: "I discovered with a spy glass two of the Moquis towns, eight or ten miles distant upon the summit of a high bluff overhanging the opposite side of the valley. They were built close to the edge of the precipice. The outlines of the close-ly packed structures looked in the distance like the towers and battlements of a castle. There was a small plateau in the center of which was a circular reservoir fifty feet in diameter lined with masonry and filled with pure cold water. The basin was fed from a pipe connecting with some source of supply upon the summit. Continuing to ascend we came to another reservoir, smaller but of more elaborate construction. Between the two, the face of the bluff had been ingeniously converted into terraces. These were faced with neat masonry and contained gardens each surrounded with a raised edge so as to retain water upon the surface. Pipes from the reservoirs permitted them at any time to be irrigated. Peach trees were growing upon the terraces and in the hollows below. Indian corn was also cultivated. A long flight of stone steps with sharp turns that could easily be defended was built into the face of the precipice and led from the upper reservoir to the part of the town." Such pictures of the southwest and its civilization could be doubled a number of times.

Corn was stored in a recess in an inner room. Large stone slabs were found which were used for grinding the corn. ⁽⁵¹⁾ Emory has made a study of the architecture and ornaments and implements and he has found a stone with six or eight perfectly symmetrical and well turned holes about ten inches deep and six or eight inches wide at the top which he supposes was used for grinding corn. Corn was the chief product of Mexico, ⁽⁵²⁾ also. Beans, magneyes, cacao, chian chile and various native fruits were raised. "The valleys" ⁽⁵³⁾ were the cornfields preferably but the high lands were used to some extent. In the latter case, the trees and bushes were cut down and the land burned over, then the seed put in among the ashes. Such lands were allowed to rest several years after each group until the ground was covered with grass for a new burning. No other fertilizer than ashes has been known. The fields were enclosed by stone walls and hedges of maquey. They had no laboring animals and their farming implements were rude. To plant corn the farmer dropped a few kernels in a hole, made with a stick and covered them with his foot, taking the greatest of pains to make the rows perfectly straight and parallel. The intervals between the hills were always uniform. The field was kept carefully weeded and at a certain age, the stalks were supported by heaping up soil. At maturity the stalks were often broken two thirds up that the husks might protect the h

hanging ear from rain." During the growth and ripening of the maize, some one always kept watch whose duty it was to drive away the flocks of birds with stones and shouts. To irrigate the fields, the water of rivers and mountain streams was utilized by means of canals, dams and ditches. These people also had granaries to preserve the corn and some of them held as many as a thousand bushels.

From the foregoing study we conclude with Professor Carr who gives his general decision in the Smithsonian report, second volume, page two hundred and ninety eight-- "that corn was cultivated in greater or less quantities by all the tribes living east of the Mississippi and south of the Great Lakes and the St. Lawrence; that the Indian looked at it as a staple article of food both winter and summer; that he cultivated it in large fields and understood and appreciated the benefits arising from the use of fertilizers." Also, corn was the staple food of all the tribes of the central west and south west but rarely found in the north west. The Indians there subsisted on fish and berries we shall find. In the southwest the Indians cultivated corn in earnest and met the problem of overpopulation and poor soil by introducing irrigation systems. The ruins still excite wonder and are as yet not scientifically explained. Cosmos Mindeleff in the thirteenth Ethnology Report, page two hundred and thirty eight says--"One of the

finest examples of an aboriginal irrigating ditch that has come under my notice occurs about two miles below the mouth of Limestone Creek. Here the ditch is marked by a very shallow trough in the grass-covered bottom, bounded on either side by a low ridge of earth and pebbles. There is no reason to suppose that the ancient ditch did not irrigate nearly the whole area of bottom land. From the character of the remains about it seems probable that the site of the ruins here designated as the Casa Grande group was occupied a long time, not as a whole but piecemeal as it were--one part being occupied and abandoned while some other part was being built up and that this ebb and flow of population thru many generations reached its final period in the occupation of the structure here termed the Casa Grande. It is probable that the ground about the ruin was still worked by its former population, who temporarily occupied it during the horticultural season, as farming outlooks were located near it.

X

3

Wild Rice

Mr. Albert Earnest Jenks who contributed to the Bureau of Ethnology , has made a full study of the Wild Rice Gatherers⁽⁵³⁾ of the upper Lakes which is probably the best account attainable anywhere. He said that he began his investigation with the hope that others should follow him with similar studies of "American primitive economics" and that it might throw some light upon the "culture status" of the North American Indians. His study has helped "to elucidate the culture position of the tribes which used wild rice by showing the motives of production, the effect on the Indian of such quantities of spontaneous vegetal food, the property-right in the rice beds and the division of labor." He has presented very clearly a picture of the aboriginal activities and his investigation has also helped to point out the reasons for the constant warfare between the Dakotas and Ojibwas which lasted for two hundred and fifty years. In fact the study is interesting from many view points.

We will pass over Mr. Jenks careful botanical study of wild rice and review the more popular description of it. "Wild rice is one of the most beautiful aquatic single stem plants in America. The grain is shed into the water where it ripens in the autumn and lies in the soft ooze of alluv-

ial mud at the bottom of the lake or river until spring when it germinates and grows rapidly to the surface. Text books have called it perennial. The old stalks die down below the surface of the water before the time arrives for the new ones to appear, so the inference has been that they all come from the same root but the plant is annual, growing from new seed each year."

It grows to the surface of the water early in June and begins to develop a fruit head. This head is about an inch long and is protected by beards usually twice its own length. The grain is enclosed in a slender cylindrical kernel, varying in length and is of a dark slate color when ripe. These seeds are mature by September. "At maturity the stalks range from two to twelve feet in height above the water and they also vary much in thickness. Then total length depends on the depth of the water in which they grow as well as the fertility of the soil. The stalks vary from five to eight feet in length to sixteen or twenty feet and about an inch or more in diameter and in places grow very densely. When seen from a distance, the rice beds look like low green islands on the lakes; on passing thru one of these when the rice is in flower, it has a beautiful appearance with its broad grassy leaves and light waving pikes, garnished with pale yellow green blossoms delicately shaded with reddish

purple, from beneath which fall three elegant straw-colored anthers which move with every breath of air or the slightest motion of the water."

The wild rice beds are injured very often by the Indians indiscreet use of them. If he continually gathers without planting sometimes the beds finally become extinguished. Waterfowls and other birds feed upon it. Storms, floods and frost also destroy it. In going over the field of investigation, Mr. Jenks says that wild rice is found in all the states of the Union except Arizona, California, Colorado, Idaho, Indian Territory, West Virginia and Wyoming. It will be noticed that many of these states lie in or west of the Rocky Mountains. A general statement may be made to this effect -- "that wherever there is a mud bottomed, water-filled hollow there wild rice flourishes."

A. Production of Wild Rice.

Mr. Jenks says "it is fortunate that the world turned its attention to a scientific and historic study of human efforts and institutions before the primitive man has entirely disappeared. In the consideration of wild rice, it is easily seen that the first act was that of simple appropriation. In such a state one cannot use the commodities in the past or future, he must use them in the present. The hungry primitive man was satisfied when he found food to eat. His want was a present want but he was often left hungry be-

cause he could not find the desired food; so at this time he conceived the thought of keeping food until a time of future need and he took an important step in the varied progress of civilization."

When we consider 'vegetal foods we ought to give primary attention to the indigenous plants which require no care and are purely native and spontaneous products." Rice is a plant of this sort and its cultivation consists to a large degree in the gathering and care of the seed. Before the grain has ripened the women go out to the rice beds in canoes and tie the stalks in bundles. Then later in the fall when the harvesting time has come, they go out again. One pushes the canoe along while the other pulls the stalks down over the canoe and beats off the fruit heads. When one end of the canoe is filled they turn back and by the time they reach the shore, the canoe is full. The author says there is little question but that woman was man's first threshing machine and that her hands were first engaged to separate the seeds from the fruit head and hull. Today a farmer locks his granary for safety but the Indian had to resort to hiding his harvest. "It is a part of the Indian morals not to steal from a friend but it is also equally a virtue to steal from your enemies." The Indians often buried rice and corn or hid it in leather bags in the banks of streams. Often it has become water soaked and even

smells very badly, they relish it very much and we often wonder if the fermentation of corn is the charm.

b. Property Right in Wild Rice Beds.

The women of course, do most of the work, so they have learned to cooperate. They plant together, reap together and then divide the crop. If a worthy family in the social group runs out of provisions, they unite and make up the deficiency. "In some tribes special fields of maize and rice are set aside by the tribe as a sort of fee-tail. After certain fields are visited habitually by families year after year, they eventually take up their temporary or permanent abode at or near the fields and no one disputes their ownership unless it is from their enemies, then a contest decides it, Indians are often found in want soon after harvest. "It may be due not to overproduction and under distribution but to underproduction as well." The amount which families gather varies from five to twenty five bushels. Statistics are meagre and this part is indefinite.

c. Consumption of Wild Rice.

Wild rice is considered by some people to be as good as the white rice of commerce while others deny it. It has been proved, however, "that wild rice is more nutritious than maize, green corn, corn meal, berries and other common cereals." "Wild rice is rich in nitrogen--free extract; that is carbohydrates, such as starch, sugar etc . which are

heat producers. In the economy of the animal body they are transformed into fat. They thus produce both heat and fat. It is richer in flesh-producing substance than any of the other foods given above. It is therefore true that wild rice is the most nutritive single food which the Indians of North America consumed. This diet of rice, maple sugar, with bison, deer and other meats was probably richer than the average American family today. "The Indians prepared it in many different ways as they did corn. But their meal time has not yet been definitely decided. "Why it is that people of one nation have three meals in twenty four hours and others five, is a matter of sociologic speculation." We can say though that as sustenance of life becomes more dependable, the meal time usually tends to become regular. In closing the consideration of wild rice we may very fittingly quote Mr. Jenks: "General social and economic interpretations are with primitive man as with wild animals; there are two chief foci from which radiate the primary activities of the individual and his society. Both are connected with the processes of growth--one, that of food-getting and the other, that of reproduction. Along these radiations the majority of life's struggles are fought--along those of the first, the individual seeks to survive, along the second, that others may survive and that he may perpetuate his species. In the evolution of animal life,

these struggles may be classified--first , as purely chemical; next, as predominantly instinctive and last, conscious.

X 4
Beans, squashes and other Vegetables.

While corn has always been considered the staple food product of the Indians, still we find that a long list of other vegetables are usually found in every allusion to its cultivation. For example, Frederick S. Dellenbaugh says, ⁽⁵⁴⁾ "the Amerind of North America has generally been considered a shiftless and indolent being but the preceding pages which have told of his success in making blankets, rugs, baskets, sculpture etc. have shown up that faulty assumption. The Amerind was as industrious as his environment demanded. Their communal principle of living is shown by the size of their houses. Throughout the continent except in the Far North and Northern California and the Northwest coasts, the Amerind was generally a tiller of the soil, growing, often in large quantities--maize, beans, squashes, cotton and other products according to locality." In 1740, Mr. Beatty ⁽⁵⁵⁾ reports of his trip thru Wisconsin and says the Indians were raising corn, beans, melons and other fruit. Mr. Cuming ⁽⁵⁶⁾ writes in 1759 that the Indians of the central west were raising wheat, corn, beans, squashes and some cotton. In volume five of the Early Western Travels the Mahas in Missouri were said to be cultivating corn, beans, melons, squashes and tobacco. In volume fifteen, Council Bluffs was a center for corn, pumpkins and pomme blanch which is some-

thing like our sweet potato. In 1819 and 1820, Kansas and Oklahoma⁽⁵⁷⁾ were observed to have corn fields and cotton fields. In 1819, the Cherokee⁽⁵⁸⁾ raised corn, cotton and sweet potatoes. The writer went on to state that most of them were agriculturists. The Osages, Sioux and Crows cultivated maize, pumpkins, beans, squashes and watermelons. In the Kansas Historical Collections,⁽⁵⁹⁾ Mr. Richey reports that the plains when seen by the Spanish in 1541 were cultivated and that the people at the settlements raised corn, beans, melons and pumpkins. In the account of Fernando De Soto's Expedition, Mr. Clay Maccauley⁽⁶⁰⁾ says that in the southeast "sugar cane seems to be cultivated as a passing luxury." A number of families would leave their homes and go out for a week to make syrup. The cane grew two inches or more in diameter and seventeen feet or more in length. In another place he says, "I pared some of their small wild potatoes and dipping them in the sweet liquid, ate them." They also raised sweet potatoes, beans and melons and around their homes were many banana plants.

Koonti is another root which contains a large quantity of starch. Some think that it yields an amount of starch equal to that of the best Bermuda Arrowroot which white men call "Indian bread root." The Indian process of making Koonti flour is unique. They gathered the roots, washed them and laid them in heaps near the "Koonti Log." In this

trough the koonti was placed and pounded up into a pulp by the use of mortars. Then pulp and all is soaked in water and washed thru a straining cloth and the starch caught in a deer hide below. The pulp is thrown away but the starchy sediment is left to ferment for a few days. Then the sediment is taken out and spread on palmetto leaves to dry. It is a yellowish white when ready to use and the bread made with it is orange in color and usually saltless but still no distasteful.

Father le Petit in a letter⁽⁶¹⁾ written from New Orleans tells of the communal farms of the Indians also. "Each year the people assemble to plant one vast field with Indian corn beans, pumpkins and melons and then again they collect in the same way to gather the harvest." In Z. M. Pike's Expedition we learn that the Reynards⁽⁶²⁾ a tribe on the west side of the Mississippi river raised large quantities of corn, beans, and melons. While in the mountains of Colorado on the Headwaters of the Arkansas River in 1807, he writes "after repairing our guns we marched, but were obliged to leave our horses. We ascended the river, both sides of which were covered with old Indian camps at which we found corncobs. This induced us to believe that those savages although erratic, must remain long enough in one position to cultivate this grain and other vegetables." "The Osages⁽⁶³⁾ raise large quantities of corn, beans and pumpkins which

they manage with the greatest economy in order to make them last from year to year." In New Mexico,⁽⁶⁴⁾ they cultivate corn, wheat, rye, barley, rice, tobacco, vines and all the culinary plants cultivated in the same latitude in the United States. New Mexico has the exclusive right of cultivating tobacco." Elliot Cones writes of the Lewis and Clarke Expedition⁽⁶⁵⁾ thus, "The Indians of the Missouri, more especially those who do not cultivate maize, make great use of the sunflower seed for bread or in thickening their soup. They pound it between two stones, until it is reduced to a fine meal." "Along the shores of the Missouri⁽⁶⁶⁾ we saw great quantities of the common thistle and procured a further supply of wild onions and a species of garlic, growing on the highlands. There were also much of the wild flax as well as some bulrush and cattail flag." Along the Missouri, they found in addition "the prickley-pear,⁽⁶⁷⁾ one of the greatest beauties, as well as the greatest inconvenience of the plains. The sunflower was very abundant, Lamb's quarter, wild cucumber, sand rush and narrow dock are also very common."

We are surely lead to believe from these facts that vegetal foods meant a great deal to the Indians. And by the use of these lesser food products we judge somewhat of the advancement of the respective tribes of the continent.

5
X Berries, fruits and nuts.

Long before the Indians had thought of tilling the soil they had made use of the roots and herbs which they could find. So we expect to find frequent mention of them. Cahmplain on his voyage of 1615⁽⁶⁸⁾ mentions "the blue-berry with raspberries and other small fruit as growing in marvellous abundance along the river banks in western Canada and as dried for winter use by the natives." Josselyn says of the berries in the New England Rarities, page one hundred and ninety seven--"the Indians dry them in the sun and sell them to the English by the bushel; the English make use of them instead of currants." We learn of the condition of the Shoshones from Lewis and Clarke⁽⁶⁹⁾ who tell how difficult it was to cross the great divide and reach the Columbia river because there was no game and nothing but roots could be found for subsistence. Later on they say, "if the Indians⁽⁷⁰⁾ are as numerous as they are represented to be, they must have some means of subsistence equally within their power. They tell us that the nations to the westward subsist principally on fish and roots and that their only game are elk, deer and a few antelope--there being no buffalo west of the Bitter-root mountains. The roots⁽⁷¹⁾ which they obtained from the Indians " were of three kinds, folded separately from one another in hides of buffalo made into

parchment. The first is a fusiform root six inches long, about the size of a man's finger at the largest end, with radicals larger than is usual in roots of fusiform sort. The rind is white and thin; the body is also white, mealy and easily reducible to a substance resembling flour by pounding like which it thickens by boiling and is of agreeable flavor; it is eaten frequently in its raw state, either green or dried. The second species was much mutilated, but appeared to be fibrous; it was of a cylindrical form, about the size of a small quill, hard and brittle. A part of the rind, which had not been detached in the preparation was hard and black; but the rest of the root was perfectly white. This the Indians informed us was always boiled before eating; and on making the experiment we found that it became perfectly soft but had a bitter taste which was nauseous to us, though the Indians seemed to relish it; and on giving the roots to them, they were heartily swallowed. The third species was a small nut (tuber) about the size of a nutmeg, of an irregularly rounded form, something like the smallest of the Jerusalem artichokes which on boiling we found them to resemble in flavor. It is certainly the best root we have seen in use among the Indians. On inquiring from what plant these roots were procured, they informed us that none of them grew near this place." In the Columbian tide water of the Pacific Ocean there is an island⁽⁷²⁾ three miles in length

and about one in width. The land is rich and covered with a great number of strawberry vines from which we gave it the name of Strawberry Island. In several places it looked as though the Indians had been digging for roots; in fact the whole island showed every appearance of having been at some period in a state of cultivation. "The roots⁽⁷³⁾ used are numerous; but the wappatu or sagittania and the kamas are the principal. These are found in great quantities, the former in ponds, the latter in the prairies, particularly such as are wet; and they were formerly a great article of trade with the interior. Besides these, the roots of the sunflower and fern are largely used and a small white root of rather insipid taste. From the fern they make a species of flour which is baked into bread. The kamas season is in the latter part of May and June and then as well as in fall when the sunflower is dug, the prairies are dotted over with squaws, each armed with a sharp stick and a basket, busily engaged in digging them. At these times, camps are generally found near the skirts of timber which border the open lands for the convenience of gathering and preserving. The kamas is baked in the ground, a hole being first dug and heated with stones and the root covered over with twigs and earth. There are numerous other roots and plants used in their fresh state."

"Of the berries, such as the strawberry, salmon berry, raspberry and others which are not suitable for drying, are consumed at once; but the huckleberry, of which there are several kinds, are dried and stored for winter's use. The salmon berry, a large and somewhat coarse species of raspberry, is abundant in the river bottoms and grows to about an inch in length. There are two varieties, the yellow and purple. It obtains its name from its ripening about the same time with the height of the salmon season on the Columbia and its association with that fish in Indian superstition. Acorns in those sections of the country where the oak is found are gathered and stored for winter."

The area of California has been divided into three divisions for study. "The northern division⁽⁷⁴⁾ is well watered and wooded." Sycamore, oak, cotton wood, willow and white alder, laurel, buckeye and innumerable berry bearing bushes are everywhere in evidence. "Thousands of acres are annually covered by wild oats. The moist bottoms yield heavy crops of grass, and in summer the valleys are gorgeous with wild flowers." Bancroft tells us that they make bread from acorns which were ground into flour. They gathered a large variety of roots, berries and seeds. They also stored away large quantities for winter. In central California the Indians were very lazy and their real maintenance was on acorns, roots, grass seeds, berries and herbs. They had no

foresight and when hungry they would rob the trees of acorns where the wood peckers had stored them away. The abundance of grapes of many varieties is a remarkable feature in the southwest. Many other fruits were known there also. In fact, all of these products but reflect the physical environment.

Game, birds and fish.

As primitive people pass out of the hunting and fishing experiences into those of agriculture, we very naturally expect them to employ less and less animal life as their stable food product. And as we review the evidences of their reliance on such sustenance we shall in a negative way be pointing out those tribes as the less civilized over against those who are agricultural and sedentary. It must be remembered as it has been stated before that when a population becomes agricultural it does not indicate that they do not hunt and fish any more but that they simply coordinate their food products in a saner way.

The Indian family which would be most dependent on animal food not by virtue of his degree of advancement but of his environment is the Eskimo. In the extreme north where he lives very few plants grow but animals of many kinds do (15) abound and also some birds. We learn that the great staple of food was the flesh of the sea animal which they designate as the "little rough seal." It is abundant at all seasons while there are but few species of fish found in the salt water. "They also eat the flesh of the other three species of seal, and the walrus, the polar bear and 'bowhead' whale, the white whale and all the larger kinds of birds, geese, ducks, gulls and grouse. They seek for all kinds of eggs

and they informed the investigators that the buds of the willows are sometimes eaten. They usually cook their food but it is sometimes eaten raw or frozen. The only drink which they have is water and no narcotic was known until the white man introduced tobacco. Those branches of the Athapascan and Alkonquian families which lived in the forest area and the northern area of Canada⁽⁷⁶⁾ hunted the polar bear the arctic fox, arctic hare, musk ox, white lemming, barren ground caribou, the walrus and among birds the willow ptarmigan. The women gathered the berries and roots which they could find.

In the eastern part of the United States the deer, elk and moose and several species of fowl furnished the objects of their hunts. West of the Mississippi on the Great Plains was found the famous buffalo. The Lewis and Clarke Expedition⁽⁷⁷⁾ report thus, "In the course of the day's travel up the Missouri River we killed a quantity of game and saw some signs of others as well as beaver and many tracks of the brown bear. We also caught great quantities of white fish." "On June thirteenth the hunters⁽⁷⁸⁾ who had been sent out, now returned loaded with buffalo meat." "In the afternoon Goodrich caught in the falls some of both kinds of white fish and a half dozen trout from sixteen to twenty-three inches long, precisely resembling, in form and in position of the fins, the mountain or speckled trout of the United States

except that the specks of the former are of a deep black while those of the latter are of a red or gold color." "There are vast quantities of buffalo feeding ⁽⁷⁹⁾ on the plains or watering in the river which is also strewn with floating limbs and carcasses of these animals." "Our hunters brought in ten deer and we shot two out of a herd of buffalo that came to water at Sulphur spring . There is a species of goose berry growing abundantly among the rocks on the sides of the cliff."

Zebulon M. Pike in his Mississippi voyage taken in 1805 tells of the game and birds of the Middle West. "The Sandy Lake Indians ⁽⁸⁶⁾ have horses, raise plenty of Irish potatoes; catch pike, suckers, pickerel and white fish in abundance. They also have beaver, deer and moose but the provision they chiefly depend upon is wild oats." "Beyond the Dubuque among the Sioux we stopped at some islands about ten miles above Salt river where there were pigeon-roosts and in about fifteen minutes, my men had knocked on the head and brought on board two hundred and ninety eight. I had frequently heard of the fecundity of this bird and never gave credit to what I then thought inclined to the marvellous; but really the most fervid imagination cannot conceive their numbers. Their noise in the woods was like the continued roaring of the wind. The young ones we killed were nearly as large as the old ones; they could fly about ten steps and were but one

mass of fat; their craws were filled with acorns and wild peas."

Lewis and Clarke travelling up the Missouri speak of the birds. ^(§1) "The only timber to be found is in the low grounds which are occasionally on the river and these are the haunts of innumerable birds, which, when the sun began to shine, sang very delightfully. Among these birds they distinguished the brown thrush, robin, turtle-dove, linnet, goldfinch, large and small blackbirds, wrens and some others. Further it is stated that they often saw several herds of buffalo and mule-deer and antelopes on the plains. ^(§2) On June tenth, they tell of seeing a small bird--like the blue ^(§3) thrush or catbird. They also state that they have observed none since they left the Osage River.

Dr. Morse who visited the Menomini Indians ^(§4) in 1820 says of their food, "In the spring they subsist on sugar and fish; in the summer, on fish and game; in fall, wild rice and corn; in winter fish and game." The fish which were mostly sturgeon and trout were caught by means of a spear though some nets were used. They made use of two forms of game traps--a large one is a dead fall made of logs and used in catching bear and a smaller one for other animals is similar. The bow and arrow was used extensively in hunting.

In all the narratives of early life we find few references which would lead us to believe that the Indian had made much headway in the domestication of animals. In the south west, however, poultry raising was known to a considerable extent. To generalize, game, fish and birds were always employed where they could be obtained but not always used independent of vegetable life except where necessary.

6 † From the foregoing review of the evidence of agriculture in North America we conclude that the Indians may be said to have been agricultural or a partially settled race with as much authenticity as would support the idea that they were wandering savages. Upon the advent of the whites,⁽⁸⁵⁾ they were cultivating beans, corn, artichoke, cotton, gourds, grapes, grasses, onions, passion flowers, many varieties of pumpkins and squashes, sunflowers and tobacco. Over against these, they employed from the harvest without cultivation, berries of all sorts, nuts, honey from bumble bees, Indian bread-root, wild cucumbers, prickley pears, Indian turnips, wild potatoes and wild rice. Besides these marked evidences of culture, their attempts at irrigation and fertilization and other achievements by which they endeavored to control the physical environment, all point to the fact that the culture status of the Indians at the discovery of the continent was much higher than is ordinarily supposed and believed.

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